

WinFrog Device Group:	GPS
Device Name/Model:	PTU
Device Manufacturer:	
Device Data String(s) Output to WinFrog:	Magnavox proprietary NMEA-0183
WinFrog Data String(s) Output to Device:	Polls active PTU's
WinFrog Data Item(s) and their RAW record:	POSITION 303

DEVICE DESCRIPTION:

The PTU (Position Telemetry Unit) is a differential GPS positioning unit designed for remote tracking applications. The unit consists of a Magnavox 6-channel GPS receiver, a Pacific Crest UHF telemetry radio, a micro-controller and a power supply. These components are housed in a watertight case with GPS signal, telemetry antenna and power connectors. The PTU can operate in *position* or *pseudorange* modes. In WinFrog applications only *position* mode is used.

WinFrog communicates with one to eight PTU's via a Pacific Crest telemetry radio. The telemetry radio is interfaced to one of WinFrog's serial ports. Each PTU must be configured with its unique hardware ID. This is done by switch settings inside each unit. As the switches cannot be seen without opening the unit, it is helpful to mark the outside of the PTU with its ID or attach a weatherproof tag with the ID marked on it. If possible, ensure that each PTU responds properly at its assigned address before leaving the workshop.

DEVICE CONFIGURATION INSTRUCTIONS

WINFROG I/O DEVICES > EDIT I/O:

Baud Rate: 9600

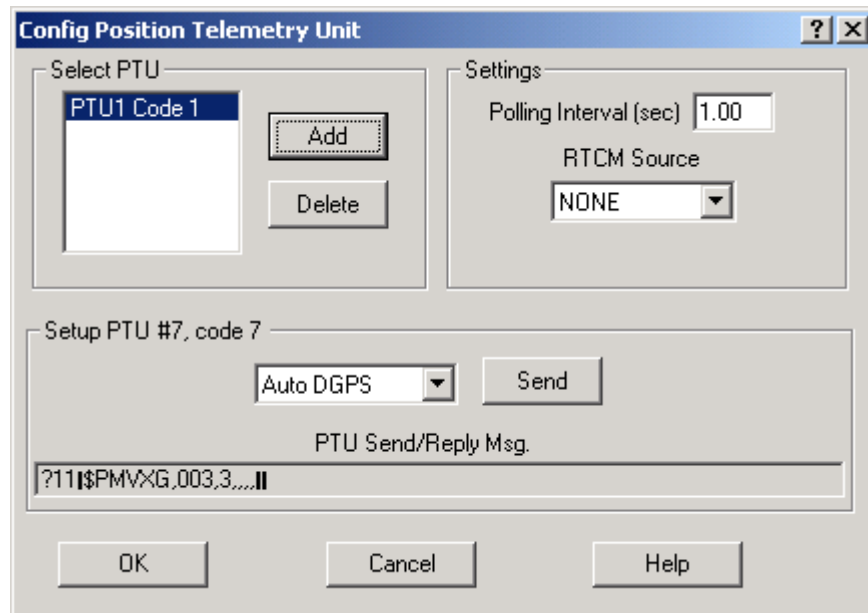
Data Bits: 8

Stop Bits: 1

Parity: none

WINFROG I/O DEVICES > CONFIGURE DEVICE:

This device must be configured at the I/O Device window level. In the I/O Devices window, click the device name to select it, then right-click and select Configure Device. The Config Position Telemetry Unit dialog box appears, as seen below.



The **Configure Position Telemetry Unit** dialog has facilities for adding or removing PTU's from the network, communication settings, and a diagnostic capability for controlling and monitoring individual units.

Adding a PTU to the Network

Click the **Add** button to open the **Position Telemetry Unit** dialog. Enter a PTU ID between 0 and 7 in the input box then click **OK**. The PTU ID will appear in the list box in the Config Position Telemetry Unit dialog, indicating the code entered. The format of the entry is "PTU*i* Code *j*", where *i* is an index given to the PTU in the order entered, and *j* is the PTU hardware address or code corresponding to the switch setting inside the unit.

Deleting a PTU from the Network

Highlight the PTU to be removed from the network and click **Delete**. The associated entry will be removed from the list.

Setting the Polling Interval

WinFrog will poll all active PTU codes in each polling cycle. The Polling Interval sets the time interval between each polling cycle. With larger numbers of PTU's, or to conserve power, if PTU's are battery powered it may be desirable to increase the cycle time from the default of 1 second.

Setting the RTCM Source

If WinFrog is interfaced to a device providing RTCM SC-104 differential corrections, the data may be relayed to PTU's in the network so that PTU will compute more accurate differentially corrected positions. Select the RTCM device from the **RTCM Source** dropdown list box.

Using the PTU Setup & Diagnostics

The PTU to be configured must be selected in the dropdown list box under **Select PTU**. This will update the PTU index and code in the group box legend. There are four PTU commands and three PTU status queries available in the list. Commands, queries and responses are in Magnavox proprietary NMEA-0183 sentences. The procedure is to select the command or query, then click **Send**. Clicking **Send** will cause the message to be sent to the PTU via the telemetry radio, and displayed in the **PTU Send/Reply Msg.** field. If a query is sent to the PTU, its reply will be displayed in the **PTU Send/Reply Msg.** field. Normally it will take the PTU up to a few seconds to respond to a query due to message scheduling in the PTU itself. Commands available are:

Command	Description
Auto DGPS	The Magnavox GPS receiver will switch between GPS and DGPS positioning based on the availability of valid differential corrections
Warm Start	The Magnavox GPS receiver will re-start using currently configured parameters (Latitude, Longitude and Datum must be entered in the Manual GPS Configuration dialog)
Initialize	Initializes the time and position of the Magnavox GPS receiver
GPS Only	Switches the Magnavox GPS receiver to compute uncorrected GPS positions whether or not differential corrections are available

Status queries available are:

Query	Description
PTU Status?	Requests the navigation status of the Magnavox GPS receiver
Diff. Status?	Requests the differential positioning status of the Magnavox GPS receiver
DOPS & SV's?	Requests the dilution of precision, and satellites tracked from the Magnavox GPS receiver

WINFROG VEHICLE > CONFIGURE VEHICLE DEVICES > DEVICE DATA ITEM > EDIT:

Adding the PTU device creates the POSITION data item. Once the data item has been added to the vehicle, it must be edited to suit the application.

Data item: GPS, PTU, POSITION

The Position data item must be edited once it is added to a vehicle's device list. Highlight the POSITION data item in the vehicle's device list, then click the Edit button. The Configure Position dialog box appears as seen below.

The screenshot shows the 'Configure Position' dialog box. It has a title bar with a question mark and a close button. The dialog is divided into several sections. The 'Calculation' section has two radio buttons: 'Primary' (which is selected) and 'Secondary'. To the right of these is a checkbox labeled 'Use for Heading Calculations'. The 'Graphics' section has two radio buttons: 'Off' (selected) and 'On'. The 'Elevation' section also has two radio buttons: 'Off' (selected) and 'On'. The 'Accuracy' section has a text box containing '5.00m'. The 'Code' section has a text box containing '0'. The 'Offsets' section has three text boxes: 'Fore/Aft' containing '0.00m', 'Port/Stbd' containing '0.00m', and 'Height' containing '0.00m'. At the bottom of the dialog are three buttons: 'OK', 'Cancel', and 'Help'.

Calculation:

Set the Calculation selection to Primary or Secondary. Devices set to Primary calculation are used to provide a vessel position. Note that more than one Primary positioning device can be added to a vehicle's device list; data from these devices

will be combined in a weighted mean solution. (See the paragraph on Accuracy below for more on the weighting of Primary calculation device data).

If the Calculation type is set to Secondary, WinFrog will simply monitor the device's data. WinFrog will not use the position data from the device in the final solution of the vehicles' position.

Note: In the case of Primary device failure, WinFrog will not automatically use the Secondary devices for the vessel's position computation. Instead, the vehicle's positioning will go to dead reckoning (if dead reckoning is turned on). You must manually change a Secondary device to Primary in order for the data to be utilized.

Use For Heading Calculations:

Select this checkbox if the device is to be used in conjunction with another GPS device for determination of the heading of the vessel. The vessel's heading will be derived by the inverse of the GPS antenna coordinates.

Graphics:

If On is selected, a labeled square will show the raw (offset but unfiltered) location of the GPS antenna in the Graphics and Bird's Eye windows. This provides a means of comparing raw device and filtered vehicle positions.

Elevation:

Setting the Elevation option to On will result in the elevation determined by GPS to be used as the elevation of the vessel referencing the GPS (WGS84) Ellipsoid. The sounder data recorded in WinFrog's .RAW data files will not be affected. This option is meant only for those applications where there is no fixed vertical reference (i.e. mean sea level), such as on a river. For acceptable results, this option requires the use of high accuracy "RTK" GPS data.

Accuracy:

The Accuracy value entered provides WinFrog with the expected accuracy of the position from this device. This value is used in the weighting of this device compared to other positioning devices that may be added to the vehicle's device list. The smaller the value entered, the more accurate it is considered to be, and hence the more weight that will be applied to the device's data. The Accuracy parameter can be changed from the suggested values; changes should be made with caution, however, as they will affect the final filtered position of the vehicle.

Code:

This entry window is used when the GPS data is being received by a remote GPS receiver connected via telemetry link. If this is the case, set the Code to coincide with the code parameters associated with the GPS unit being used.

For all other applications, the Code entry must be set to 0.

Offsets:

Offsets are required to associate the GPS antenna position with the vessel's Common Reference Point (i.e. CRP). The offsets are applied *from* CRP (of the vehicle) *to* the GPS antenna location.

Forward Offsets are entered as positive values.

Aft Offsets are entered as negative values.

Starboard Offsets are entered as positive values.

Port Offsets are entered as negative values.

Height Offsets are positive upwards. (It is suggested that the vessel's Height origin should be at the water line.

TELGRAM SPECIFICATION:

Magnavox proprietary NMEA-0183